GEORGIA INSTITUTE OF TECHNOLOGY — OFFICE OF CONTRACT ADMINISTRATION

PROJECT ADMINISTRATION DATA SHEET

[X] ORIGINAL [ ] REVISION NO. _____

Project No. G-34-603 GTRI/~~GTX~~ DATE 9 / 25 / 84

Project Director: Paul Armstrong 115 School/~~Dept~~ English

Sponsor: National Endowment for the Humanities

Type Agreement: Grant No. EK-20074-84

Award Period: From 10/1/84 To ~~12/31/85~~ 3-31-86 (Performance) 3/31/86 (Reports)

Sponsor Amount:	This Change	Total to Date
Estimated:	$ 43,725	$ 43,725
Funded:	$ 43,725	$ 43,725

Cost Sharing Amount: $ 54,164 Cost Sharing No: G-34-318

Title: Literature and Science Introductory Course

ADMINISTRATIVE DATA

OCA Contact _____

1) Sponsor Technical Contact:

Lyn Maxwell White
National Endowment for the Humanities
Division of Education Programs
Mail Stop 202
Washington, D.C. 20506

2) Sponsor Admin/Contractual Matters:

Sue Traylor
National Endowment For the Humanities
Grants Office
Room 310
1100 Pennsylvania Avenue
Washington, D.C. 20506

Defense Priority Rating: N/A

Military Security Classification: N/A

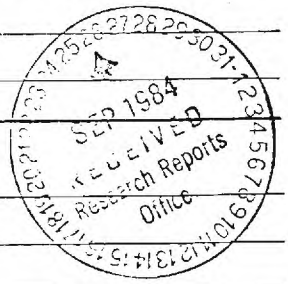
(or) Company/Industrial Proprietary: N/A

RESTRICTIONS

See Attached NEH Supplemental Information Sheet for Additional Requirements.

Travel: Foreign travel must have prior approval – Contact OCA in each case. Domestic travel requires sponsor approval where total will exceed greater of $500 or 125% of approved proposal budget category.

Equipment: Title vests with None proposed or anticipated



COMMENTS:

I.D. No. 02.131.000.84.005

COPIES TO:

Project Director	Procurement/EES Supply Services	GTRI
Research Administrative Network	Research Security Services	Library
Research Property Management	Reports Coordinator (OCA)	Project File
Accounting	Research Communications (2)	Other I. Newton

FORM OCA 4.383

GEORGIA INSTITUTE OF TECHNOLOGY OFFICE OF CONTRACT ADMINISTRATION

SPONSORED PROJECT TERMINATION/CLOSEOUT SHEET

Date 9/17/86

Project No. G-34-603 School/~~Lab~~ English

Includes Subproject No.(s) N/A

Project Director(s) Paul Armstrong GTRC / ~~GTX~~

Sponsor National Endowment for the Humanities

Title Literature and Science Introductory Course

Effective Completion Date: 3/31/86 (Performance) 6/30/86 (Reports)

Grant/Contract Closeout Actions Remaining:

- [X] None
- [ ] Final Invoice or Final Fiscal Report - already submitted
- [ ] Closing Documents
- [ ] Final Report of Inventions
- [ ] Govt. Property Inventory & Related Certificate
- [ ] Classified Material Certificate
- [ ] Other

Continues Project No. Continued by Project No.

COPIES TO:

Project Director
Research Administrative Network
Research Property Management
Accounting
Procurement/GTRI Supply Services
Research Security Services
Reports Coordinator (OCA)
Legal Services

Library
GTRC
Research Communications (2)
Project File
Other I. Newton
A. Jones
R. Embry

FORM OCA 69.285

G-34-603

FINAL REPORT

LITERATURE AND SCIENCE INTRODUCTORY COURSE

Dr. Paul B. Armstrong, Project Director
Dr. Kenneth J. Knoespel, Acting Project Director
Dr. Robert M. Markley
Dr. James D. Young

Final Report for Period September 1984 - March 1986

Under

National Endowment for the Humanities Grant

GEORGIA INSTITUTE OF TECHNOLOGY
A UNIT OF THE UNIVERSITY SYSTEM OF GEORGIA
DEPARTMENT OF ENGLISH
ATLANTA, GEORGIA 30332

FINAL REPORT

LITERATURE AND SCIENCE INTRODUCTORY COURSE

National Endowment for the Humanities Grant
September 1984--March 1986
Department of English, Georgia Institute of Technology

Dr. Paul B. Armstrong, Project Director
Dr. Kenneth J. Knoespel, Acting Project Director
Dr. Robert M. Markley
Dr. James D. Young

Preamble

During the period of the grant, the literature and science introductory course (English 2301) firmly established itself as part of the Department's basic curriculum. It is one of four sophomore-level introductory courses which have been recently established to prepare students for more advanced work in a particular area of the humanities: drama and film, American literature, the western tradition in literature and the arts, and literature and science. These area programs are roughly the equivalent of a minor in English (the Department does not offer a major), and they are designed to help students achieve focus and increasing sophistication in selecting courses to satisfy an eighteen-hour (six-course) humanities requirement.

The literature and science introductory course was first offered as an experimental special seminar to two small groups of students in the winter and spring of 1984. It was then approved by the Academic Senate and has been taught as a regular part of the curriculum with its own course number in every quarter since the winter of 1985. The enrollments in the course have been steadily on the rise, and the number of sections offered per quarter has gradually risen as well: 3 sections, 71 students in Winter 1985; 5 sections, 128 students, Spring 1985; 3

sections, 96 students, Fall 1985; 4 sections, 128 students, Winter 1986; a total of 15 sections, 423 students over the five quarters of the grant (see Appendix A, "Literature and Science Enrollments").

The period of the grant was extended by a quarter to accommodate the addition of a new member of the staff, Dr. Robert M. Markley (to replace Dr. Robert L. Snyder, who departed for another institution). The extension allowed Dr. Markley to teach in the literature and science program for a quarter before taking his faculty development leave. He was thus better able to direct his activities during his time off to the specific needs and interests of the program.

We solicited the assistance of consultants who represented three areas central to literature and science: literary theory, the history of science, and the philosophy of science. Our consultant in literary theory has been Barbara Herrnstein Smith, author of Poetic Closure (1968) and On the Margins of Discourse (1978), who is currently writing a book on the problems of value. The historian of science whose services we secured was Allen G. Debus, author of The Chemical Philosophy (1977), Man and Nature in the Renaissance (1978), and numerous other books and articles on science and medicine before and during the scientific revolution. Our consultant in the philosophy of science has been Stephen E. Toulmin, author of Human Understanding (1972), An Introduction to Reasoning (1979), The Return to Cosmology (1982), and many other books on such problems as theory-change, the historical status of reason, and epistemology.

The following report on the activities of the literature and science faculty during the period of the grant is divided into four sections: 1) Developments in the Introductory Course; 2) Related Activities; 3) Dissemination and Publicity; 4) Future Problems and Possibilities. A series of appendices document our remarks.

The appendices include brief statements describing how the staff members used their faculty development quarters (see Appendices J, K, L, M).

1. Developments in the Introductory Course

Our experiences in the classroom confirmed the basic structure of the course, although we have made many variations on it of a minor but significant nature. The course attempts to challenge the opposition between the humanities and natural sciences by comparing and contrasting different modes of thought and expression. The course is divided into three sections, each of which asks a particular question about how we know and talk about the world:

--How do the assumptions and conventions which an artist or a scientist inherits from his community make possible and at the same time limit what he can see and say?

--If collectively shared paradigms or frameworks are necessary for constructing and communicating a depiction of nature, how and why do representations of the world change in literature, the visual arts, and science?

--If literary interpretation and scientific observation are not neutral mirrorings of their object of knowledge but are guided by the presuppositions, interests, and expectations of the interpreter's community, how can we judge their correctness?

Each of the members of the literature and science staff structured his version of the course around these three central issues. We decided early on, however, that it would be a waste of each member's unique talents and ingenuity to force us all to give exactly the same course. There are differences in choice of

texts and in conceptual emphasis among our various syllabi (see Appendices B, C, D, E). But there is unity in the course across its different versions because each syllabus focuses on the same questions.

Some of the differences in the syllabi reflect the different backgrounds and training of the staff. While the medievalist among us uses Galileo to introduce students to the role of presuppositions and conventions in scientific understanding, the two modernists prefer James Watson's autobiographical description of the discovery of DNA, and the seventeenth-century specialist teaches examples of scientific writing from that century. Some of the differences arise from different experiences in the classroom. Some of us have found that John Berger's provocative demystification of the political implications of ways of representing the unclothed human body provides students with a powerful demonstration of the hidden presence of assumptions and conventions in visual representations. Others of us have found that E. H. Gombrich's classic exposition of the process of "schema" and "correction" offers a clearer, more refined analysis of the epistemology of realistic art.

We think that such differences are important to preserve. They keep the course more lively and interesting (both to us and to our students) than it would be if we all tried to fit into the same mold, and they also open the course up to productive experimentation. The danger, of course, is anarchy and fragmentation--four different courses, not four versions of the same course. We have avoided this by meeting frequently and regularly to discuss our experiences with the course, to exchange advice about how it might be improved, and to explain the variations we have individually introduced. These discussions have provided more real unity and focus to our teaching of the course than a shared syllabus would have done, and

they should be continued even after the course is no longer new.

Much of the time we spent discussing the course among ourselves and with our consultants has been devoted to practical pedagogical matters. We found early on, for example, that our original syllabus was too optimistic in the amount of theoretical material it assumed a class could digest in one session. Instead of assigning multiple essays on a topic for one class meeting, we found it better to concentrate on a single piece. Instead of reading a difficult (and, we found, repetitive and poorly organized) text like Kuhn's The Structure of Scientific Revolutions in its entirety, it was more effective to analyze certain key sections in detail. We discovered that Joyce's A Portrait of the Artist as a Young Man was much more difficult for our students to assimilate than we had expected--but the reason, apparently, was that they lacked the interpretive conventions and the assumptions about narrative necessary to understand it. The dependence of understanding on presuppositions and expectations is exactly what this section of the course is supposed to deal with, and so we found that instead of abandoning the novel as too difficult we could use the students' bewilderment as an illustration of the issue we try to use the text to explore.

We also devoted many hours which are not easily summarized to comparing the advantages and disadvantages of teaching particular poems in the middle section of the course. The difficulty of that section, we discovered, is that we have to teach students how to read poems at the same time we are asking them to reflect on how poetic language represents the world and why its styles of depiction change. The advantage of this double mission, however, is that students who might otherwise not know how to begin asking questions to make sense of a poem have a direction of inquiry provided for them by the theoretical issues we

raise. We have also found it pedagogically valuable to compare the process of reading--the projection, testing, and refinement of hypotheses about the relation between part and whole--with the hypothesis-testing in science.

Thanks in part to the suggestions of our consultants, we are contemplating several further variations in the course:

--a unit examining the role of gender in literature and science;

--the addition of film as an example of visual representation;

--the inclusion of more scientific writing to explore the relations between its epistemological conventions and its stylistic norms;

--attention to the relation between so-called "high culture" and "popular culture" to investigate the status of conventions in each.

These changes could be assimilated into the basic structure of the course. They are examples of ongoing experimentation which we expect and hope will continue as long as the course is taught.

2. Related Activities

Each of our consultants visited Georgia Tech once during the 1984-85 academic year and, in addition to offering advice about the introductory course, held a seminar on his or her recent research for the Literature and Science Study Group. This faculty discussion circle includes not only the literature and science staff but also other humanists, philosophers, psychologists, social scientists, and architects from the Tech community. The group has met twice a quarter since its inception in the fall of 1984, and each session has been devoted to a mutually agreed upon text in literary theory or the philosophy of science. Readings have included works by Thomas Kuhn, Jacques Derrida, Paul Feyerabend, Karl Popper,

Ludwig Wittgenstein, Paul Ricoeur, and others. The study group was founded in the conviction that developing a curriculum in literature and science was not only a practical pedagogical matter but also an intellectual enterprise in which basic conceptual questions would have to be asked. The group provides a forum for intellectual exploration to complement the pedagogical discussion of the literature and science staff.

The consultants returned for a second visit to Tech on February 20-21, 1986, to review our progress with the introductory course and to participate in a public symposium entitled "Representation and Value: Literature, Philosophy, and Science." (See Appendix F for a detailed description of the program.) More than 125 faculty and students attended the symposium. They came not only from Georgia Tech but also from a variety of institutions in the Atlanta area, such as Emory University, Georgia State University, University of Georgia, Valdosta State College, and Mercer University. Each of the consultants gave a major lecture:

--Barbara Herrnstein Smith, Professor of English and Communication at the University of Pennsylvania: "Value without Truth-Value";

--Allen G. Debus, Morris Fishbein Professor of the History of Science at the University of Chicago: "Myth, Allegory, and Scientific Truth: An Alchemical Tradition in the Period of the Scientific Revolution";

--Stephen E. Toulmin, Professor in the Committee on Social Thought, University of Chicago: "Beyond Hermeneutics: From Critical Theory to Practical Interpretation."

The repondents were chosen to represent a variety of different disciplines and institutions and included a physicist, an architect, a philosopher, two literary theorists, and a literary historian.

As an activity concurrent to the grant, the Literature and Science program co-sponsored with the Price Gilbert Memorial Library at Georgia Tech an exhibit entitled "Framing the Foundations: An Exhibition of Rare Books in the History of Science and Technology." The exhibit ran from October 11, 1985, to February 22, 1986, and included works from the sixteenth to eighteenth centuries in the fields of cartography, architecture and engineering, mathematics, and natural philosophy. A deluxe edition of Joan Blaeu's Atlas Major (1664-65) and a first edition of Newton's Principia (1687) were among the books displayed. The exhibition, which evolved from the use of these rare books in our courses on Galileo and Newton, attracted the attention of students and faculty alike; it has drawn interest to the literature and science program and encouraged the ongoing care and use of this special teaching collection at Georgia Tech.

In order to facilitate our faculty development, we developed a basic "Instructor's Bibliography" for teachers of the literature and science course (see Appendix G). The bibliography includes basic texts in the philosophy of science, literary theory, and literary and intellectual history. The texts on the list constitute a kind of canon in the still developing field of literature and science.

3. Dissemination and Publicity

Because the literature and science program was a new addition to the English Department curriculum, we undertook a concerted effort to inform Tech faculty and students about its content and aims. This publicity campaign was especially necessary, we felt, inasmuch as the concept of a course on literature and science, although especially appropriate at an engineering school, is innovative and

unusual. We tried to spread the word about the program in a variety of ways, including:

--articles in the student newspaper The Technique (October 19, 1984) and in the faculty weekly The Whistle (October 22, 1984);

--a memo describing the literature and science curriculum in detail to all Georgia Tech deans, directors, department heads, and undergraduate advisors (October 22, 1984; see Appendix H);

--lectures by Drs. Paul Armstrong and Kenneth Knoespel to sections of the large freshman English courses 1001 and 1002 (November 1984 and February/March 1985; more than 500 students were addressed on each occasion);

--a lecture by Dr. Armstrong to the faculty of the College of Sciences and Liberal Studies, "Understanding and Truth in the Two Cultures" (February 8, 1985; 125 persons in attendance).

For Georgia Tech's Centennial Celebration in the fall of 1985, Drs. Kenneth Knoespel and James Young prepared a thirty-minute slide show on the literature and science program (see Appendix I for a copy of the script). The slides were synchronized with a taped audio recording, and the presentation was run repeatedly during the Centennial Open House. The presentation has been used since then on various occasions to provide a quick, brief introduction to the program, and it will continue to be used for this purpose in the future.

We also disseminated information about our program to other institutions. The MLA Newsletter featured Tech's literature and science curriculum in its October 1984 issue as one of several projects recently funded by NEH which might be of interest to the general MLA membership. A flood of inquiries followed this

article, and we sent out about seventy-five copies of our NEH proposal to answer them.

An article about our program also appeared in the October 1985 issue of the Forum for Liberal Education, and this story was then picked up by Academic Administrator Newsletter. More than a dozen inquiries followed from these articles, and they were answered with copies of the proposal.

The literature and science staff has lectured to a number of groups about our program. On April 17, 1985, Dr. Armstrong gave a lecture to about one hundred representatives of English departments in Georgia colleges and universities on the occasion of the annual meeting of the Regents' Academic Committee on English which was held on the Georgia Tech campus. Dr. Knoespel also gave an open lecture about the rare-book exhibit to the Tech community on May 10, 1985. Dr. Robert Markley consulted on the development of a literature and science course a Lewis and Clark College during January and February, 1986.

4. Future Problems and Possibilities

The literature and science introductory course (English 2301) was intended to provide students with a base on which they could build by choosing more advanced courses of two kinds. We have already established a series of historically oriented courses on the relations between various modes of thought and expression in four particular periods: Writers in the Age of Galileo (English 3041), Newton (English 3042), Darwin (English 3043), and Einstein and Freud (English 3044). We have begun to develop a series of theoretically oriented courses devoted to special conceptual areas within the field of literature and science. A pilot course on Metaphor and Symbol in Literature and Science was given successfully in Spring of

1985. Extensive discussions have been devoted to planning a second theoretical course on the role of value and the problem of validity in the two fields. After a sufficient population of student interest and competence has been developed, we also hope to offer periodically a senior seminar on a rotating special topic as a capstone to the curriculum.

These plans may, however, be endangered by the very success of the sophomore-level introductory courses not only in literature and science but also in the other area programs. A trend seems to be developing in which students fulfill their humanities requirement by taking all of the introductory courses (in addition to the two required freshman courses in composition) instead of advancing to the junior- and senior-level courses. Some faculty have argued that this pattern should not be discouraged because students may benefit by wide exposure to different areas of the humanities. Others have worried that only superficial knowledge will result from such diversity. A decision will have to be made by the Department faculty and the administration of the College of Sciences and Liberal Studies about whether or not to allow this trend to continue. A rule might be instituted prohibiting students from counting more than two sophomore-level courses in meeting the humanities requirement.

The literature and science program needs to expand its teaching staff. Its enrollments are increasing, but the non-pedagogical responsibilities of its staff prevent them from devoting more time to teaching. Drs. Markley and Knoespel, for example, will be Fellows of the Society for the Humanities at Cornell University during 1986-87. The Society's topic for the year will be literature and science. Their positions will be temporarily filled by visiting professors, but their absence points up the fragility of a staff which is so small that two simultaneous

leaves of absence can reduce its number by half. The prominence and promise of the literature and science program justify hiring more permanent faculty to augment its staff. Volunteers from the current department faculty should also be encouraged to teach English 2301 if they are interested, and means should be found to train them. A number of faculty have already been introduced to the program's basic concepts by teaching the segment of the freshman course (English 1002) which deals with literature and science. They could perhaps use this experience as a basis for assimilating the materials in English 2301.

One reason why the literature and science program has developed such strength and prominence so quickly has been the support it has received from the administration--especially Dr. A. D. Van Nostrand, head of the English Department; Dr. Les Karlovitz, dean of the College of Sciences and Liberal Studies, and Dr. Henry Bourne, vice president for Academic Affairs. They have been actively interested in the program since its beginning. Dr. Van Nostrand resigned, however, as head of the Department in March of 1986. A search for his replacement is in progress. It is important that the new head be committed to building the literature and science program. A very promising foundation has been laid in a remarkably short time; but without continued support (in the form, for example, of new faculty to teach English 2301 so that increased enrollments can be met and current staff can to free to develop junior-level courses), what has been set in motion could easily be lost.

Another staff change could also affect the future of the program. Dr. Armstrong has accepted the headship of the English Department at the University of Oregon. An important sign of the administration's commitment to the program would be an aggressive attempt to recruit a replacement who has the reputation

and the energy necessary to expand the influence of the literature and science program within Tech and the region. In April 1986, Dr. Paul Privateer, a literary theory specialist now at the University of Southern Mississippi, was hired for 1986-87 and thereafter. Dr. Privateer's interests and abilities will add greatly to the program in literature and science, and we hope his appointment will be the first of several made in the coming years.

The symposium in February of 1986 created exciting opportunities which should be taken advantage of quickly for creating an interdisciplinary network of scholars in the Southeast who might participate in activities related to literature and science. Considerable interest was expressed at the prospect of holding future symposia, lectures, or seminars on philosophical topics which cross the boundaries between the humanities and the natural sciences. The activities could form the basis of a Center for Research in Literature and Science which could be established at Georgia Tech and which would draw on a constituency of southeastern institutions.

Such lectures and seminars should be part of ongoing efforts to disseminate information about the literature and science curriculum. The consultants to our grant felt strongly that our course would be relevant at other institutions and that work should continue to be done to publicize our program. These efforts will not be successful, however, unless the literature and science curriculum continues to thrive. The gains which have been made in establishing the curriculum in the Department and with Tech's students must not be sacrificed to a campaign for dissemination.

APPENDICES

A. Literature and Science Enrollments

B. Engl 2301 Syllabus: Armstrong

C. Engl 2301 Syllabus: Knoespel

D. Engl 2301 Syllabus: Markley

E. Engl 2301 Syllabus: Young

F. Brochure: "Representation and Value," Symposium of February 21, 1986

G. Instructor's Bibliography

H. Memo on Courses in Literature and Science (October 22, 1984)

I. "The Centennial Show"

J. Faculty Development: Armstrong

K. Faculty Development: Knoespel

L. Faculty Development: Markley

M. Faculty Development: Young

Appendix A

LITERATURE AND SCIENCE ENROLLMENTS

		1984-85							1985-86			
		Fall '84		Winter '85		Spring '85		Total		Fall '85		Winter '86
Lit. & Science	2301			3	(71)	5	(128)	8	(199)	3	(96)	4 (128)
	3041 Galileo	1	(18)					1	(18)	1	(26)	2 (47)
	3042 Newton					1	(28)	1	(28)	1	(27)	
	3043 Darwin	1	(21)	1	(24)			2	(45)			
	3044 Frankenstein			1	(25)	1	(25)	2	(50)		53	

Also: ENGL 3085 (Metaphor and Symbol), Spring 1985--20 students

Planned for Spring 1986:

ENGL 2301--4 sections

ENGL 3042--1 section

ENGL 3043--1 section

Appendix B

Paul Armstrong
Spring 1985

ENGL 2301--LITERATURE AND SCIENCE

Course Description:

Do the humanities and the natural sciences employ different procedures of understanding, or do they use similar methods to solve different problems? We shall attempt to answer this question by comparing and contrasting various aspects of the process of understanding in many different fields: poetry, painting, science, prose fiction, and literary criticism. First we shall study how assumptions are both enabling and limiting--how presuppositions and conventions open up a particular domain only by disguising and distorting other areas. Then we will examine why the representation of nature changes in science, literature, and art. Finally, we shall ask what standards remain for distinguishing "truth" from "falsity" if many different, irreconcilable conceptions of the world compete for our allegiance.

Texts: James D. Watson, The Double Helix
Bertolt Brecht, Galileo
Thomas Kuhn, Structure of Scientific Revolutions
William Wordsworth, Selected Poetry
T. S. Eliot, The Waste Land and Other Poems
Ford Madox Ford, The Good Soldier
Xeroxes at Photo and Printing Center

Schedule:

April 3--Introduction

I. Paradigms, Presuppositions, and Conventions

April 5--Watson, The Double Helix, pp. 1-67 (optional: pp. xi-xxiii)
8-- " , " " " , pp. 67-133

April 10--Brecht, Galileo, pp. 43-86
12-- " , " , pp. 87-129

April 15--Kuhn, Scientific Revolutions, pp. 10-42, 52-65
17--No Meeting
19--Kuhn, Scientific Revolutions, pp. 77-91, 111-35, 144-59

II. The Changing Representation of Nature

April 22--Gombrich, excerpt from Art and Illusion, (xerox)
April 24--Selected Eighteenth Century Poetry (xerox): Gray, "Eton College," "On the Death of a Favourite Cat," "Elegy Written in a Country Churchyard"; Goldsmith, "The Deserted Village"
April 26--Wordsworth, Selected Poetry, pp. 103-108, 150-60, 466-

71, 474-75
29-- " , " " , pp. 178-96, 487, 493-95, 499-503, 534-36
May 1-- " , " " , pp. 541-47, 604-32

May 3--Hans Eichner, "Modern Science and Romanticism" (xerox) and Katherine Hayles, excerpts from The Cosmic Web (xerox)

May 6--T. S. Eliot, Poems, pp. 1-26
8-- " " , " , pp. 27-54
10-- " " , " , pp. 55-70

III. The Dilemmas of Relativism

May 13--Stanley Fish, "Normal Circumstances" (xerox)
15--Karl Popper, excerpts from Conjectures and Refutations (xerox) and "Normal Science and its Dangers" (xerox)
17--Paul Armstrong, "Conflict of Interpretations" (xerox)

May 20--Ford, The Good Soldier, pp. 3-102
22-- " , " " " , pp. 102-81, and Mark Schorer, "Introduction," pp. v-xv
24-- " , " " " , pp. 183-256, and Samuel Hynes, "Epistemology of The Good Soldier (xerox)

May 27--Paul Armstrong, "Understanding and Truth in the Two Cultures" (xerox)
29--Stephen Toulmin, "The Construal of Reality" (xerox)
31--Exam Due, No Meeting

June 3-7--Dead Week, No Meetings

Requirements

Class attendance and participation in discussion
3-pp. paper due April 22
6-pp. paper due May 17
Tale-Home Final Exam, 750-1000 words, due by noon May 31

Because this course will be run as a seminar, with our sessions devoted primarily to discussion, it is required that you attend class and keep up with the reading. Participation in discussion will be one quarter of the final grade. The take-home final will be an open-book essay written in response to a question announced in class on May 29. Students with conflicts may make other arrangements if they speak with me by May 17. Students may elect to take the final during the normal exam period in the week of June 10-15. This exam would be a closed-book, three-hour final consisting of identifications, explications, and an essay. Students wishing to elect this option must tell me by May 17.

Office Hours: Monday noon-1 p.m., Wednesday 1-2 p.m., and by appointment, Skiles 321
Phone: 894-2737 (office), 876-8689 (home)

Appendix C

Kenneth Knoespel
Winter 1986
MWF 9:00 and 12:00

ENGLISH 2301--LITERATURE AND SCIENCE

Course Description:

This course challenges common assumptions about the separation between literature and science and asks how we can think beyond traditional divisions between these disciplines and engage in a reformulation of the ways they are historically and theoretically complementary. The course is divided into three parts. In the first, we will consider ways literature and science call attention to conceptual patterns that inform and sometimes determine perception of nature. In the second part, vision and visual representation provide a departure point for comparison of the changing representation of nature in poetry. In the third part, we will look at the interpretive problems embracing both the study of literature and science and ask how each distinguishes what is true from what is false.

Texts: James Joyce, A Portrait of the Artist
Galileo, The Starry Messenger and Letters on Sunspots
Thomas Kuhn, Structure of Scientific Revolutions
John Berger, Ways of Seeing
Robert M. Pirsig, Zen and the Art of Motorcycle Maintenance
Xeroxes at Photo and Printing Center

Schedule:

Jan. 6--Introduction

I. Paradigms and Conventions in Understanding

Jan. 8--Joyce, Portrait of the Artist, pp. 7-101
10-- " , " " " " , pp. 102-73

Jan. 13-- " , " " " " , pp. 174-253
15--Galileo, "Introduction," pp. 1-20, and The Starry Messenger, pp. 21-50
17-- " , Letters on Sunspots, pp. 59-144

Jan. 20--No Class--Martin Luther King Commemoration
22--Paul Feyerabend, Against Method (xerox), pp. 69-139
24--Galileo, Letter to the Grand Duchess Christina, pp. 145-210

Jan. 27--Thomas Kuhn, The Structure of Scientific Revolutions, pp. 1-51
29-- " " , " " " " " , pp. 52-91, and
Karl Popper, "Normal Science and its Dangers" (xerox)
31--Kuhn, Scientific Revolutions, pp. 111-35, 144-73 [PAPER DUE]

II. The Changing Representation of Nature

Feb. 3--John Berger, Ways of Seeing, pp. 1-82
5-- " " , " " " , pp. 83-155
7--Svetlana Alpers, "The Mapping Impulse in Dutch Art" (xerox)

Feb. 10--Thomas Gray, "Elegy Written in a Country Churchyard" (xerox)
12--William Wordsworth, "Tintern Abbey" (xerox)
14--Robert Browning, "My Last Duchess," and Matthew Arnold, "Dover Beach" (xerox)

English 2301--Literature and Science,2

Kenneth J. Knoespel
Winter 1986
MWF 9:00 and 12:00

Feb. 17--T. S. Eliot, "The Love Song of J. Alfred Prufrock" (xerox)
19--Robert Lowell, "Harvard Sonnets" (xerox) [PAPER DUE]
21--No Class--students invited to attend Literature and Science Symposium, "Representation and Value: Literature, Philosophy, Science"

III. The Problem of Interpretation

Feb. 24--Robert Pirsig, Zen and the Art of Motorcycle Maintenance, pp. 1-86
26-- " " , " " " " " " " , pp. 87-178
28-- " " , " " " " " " " , pp. 179-260

March 3--Robert Pirsig, Zen and the Art of Motorcycle Maintenance, pp. 261-320
5-- " " , " " " " " " " pp. 321-406
7--N. Katherine Hayles, "Spinning the Web: Representative Field Theories and their Implications" (xerox) [PAPER DUE]

March 10--Stephen Toulmin, "The Construal of Reality" (xerox)
12--
14--

Requirements:

Class attendance and participation in discussion
2-pp. paper due Jan. 31
3-pp. paper due Feb. 19
5-pp. paper due March 7
Final Exam

The course will be run as a seminar and it is assumed that students will participate generously in classroom work. Students will write three short papers due 31 Jan., 19 Feb., and 7 March. Topics for the papers will be provided.

Office: Skiles 358
Office Hourse: Mondays and Wednesdays 1:30-2:30 and by appointment
Telephone: 894-2739 (office), 373-3397 (home)

Appendix D

Markley
English 2301
Spring 1986
Introduction to Literature and Science

Week of March 31: Introduction; Watson Double Helix

Week of April 7: Watson; Gombrich, Art and Illusion

Week of April 14: Gombrich; Kuhn, Structure of Scientific Revolutions

Week of April 21: Kuhn; Shelley, Frankenstein

Week of April 28: Shelley; Gould, "On Heroes and Fools in Science" (handout)

Week of May 5: Boyle and Shaw (handout); Gould, Mismeasure of Man

Week of May 12: Gould; Sampson, "The Decentralization of Identity" (handout)

Week of May 19: Brecht, Galileo; Feyerabend (handout)

Week of May 26: Pynchon, Crying of Lot 49

Week of June 2: Pynchon; Review

Texts: Mary Shelley, Frankenstein (Oxford)
Thomas Kuhn, The Structure of Scentific Revolutions (Chicago)
E. H. Gombrich, Art and Illusion (Princeton)
Bertolt Brecht, Galileo (Grove)
Stephen Gould, The Mismeasure of Man (Norton)
James D. Watson, The Double Helix (Norton)
Thomas Pynchon, The Crying of Lot 49 (Bantam)

Requirements: class attendance and participation in discussion
three-page paper due April 23
five-page paper due June 4
midterm exam
final exam

Office: Skiles 339
[redacted]:xMWF 10-11; 2-3
Office hours: (above)
Office extension: 894-2735

ENGLISH 2301
Fall Quarter 1985: James D. Young

1.	Th	(Sep 26)	Introduction	
			PART I: Assumptions, Conventions, and Paradigms	
2.	Tu	(Oct 1)	Watson, The Double Helix, pp. 7-133.	
	Th	(Oct 3)	"	
3.	Tu	(Oct 8)	Joyce, A Portrait of the Artist as a Young Man, pp. 7-253.	
	Th	(Oct 10)	"	
4.	Tu	(Oct 15)	Kuhn, The Structure of Scientific Revolutions, chaps. 2, 3, 4, 6	
	Th	(Oct 17)	chaps. 8, 10, 12	
			PART II: The Changing Representation of Nature	
5.	Tu	(Oct 22)	Berger, Ways of Seeing	PAPER 1 DUE
	Th	(Oct 24)	"	
6.	Tu	(Oct 29)	Gray xerox	
	Th	(Oct 31)	Blake xerox	[F: drop date]
7.	Tu	(Nov 5)	Wordsworth xerox	
	Th	(Nov 7)	Eliot, The Waste Land and Other Poems	
8.	Tu	(Nov 12)	"	
	Th	(Nov 14)	Stevens xerox	PAPER 2 DUE
			PART III: Relativism and Interpretation	
9.	Tu	(Nov 19)	Cary, The Horse's Mouth (1)	
	Th	(Nov 21)	" (2)	
10.	Tu	(Nov 26)	Toulmin, "The Construal of Reality" xerox	
	Th	(Nov 28)	[Thanksgiving break]	
11.	Tu	(Dec 3)	Cary, The Horse's Mouth (3)	
	Th	(Dec 5)	Review for Final exam	PAPER 3 DUE

ENGLISH 2301
Literature and Science

Course Description:

By challenging common assumptions about the differences between the humanities and the sciences, this course asks you to think beyond traditional conceptions of these disciplines—to compare and contrast various ways of understanding. The course is divided into three parts: first, we will consider how assumptions are both enabling and limiting, how they both allow discovery and cause distortion. Then we will examine how vision changes in the representation of nature in poetry. Finally, we will ask interpretive questions concerning the study of literature and science—seeking to discover how each distinguishes what is true from what is false.

Texts:

James D. Watson, The Double Helix
James Joyce, A Portrait of the Artist as a Young Man
Thomas S. Kuhn, The Structure of Scientific Revolutions
John Berger, Ways of Seeing
T. S. Eliot, The Waste Land and Other Poems
Joyce Cary, The Horse's Mouth
Xeroxes at Photo and Printing Center

Requirements:

Class attendance and participation in discussion
Three outside papers (due as indicated)
Final examination

Because this course will be run with the class hour devoted primarily to discussion, you are required to attend class and keep up with the reading. What the following schedule presents is a reading timetable—discussion will normally be delayed by one meeting. Instructions about the papers and the final exam will be given in class.

THOMAS GRAY
- Ode on a Distant Prospect of Eton College
- Ode on the Death of a Favorite Cat
- Hymn to Adversity
- Elegy Written in a Country Churchyard

WILLIAM WORDSWORTH
- Lines (Tintern Abbey)
- The Prelude
  - Book III. Residence in Cambridge
  - Book IV. Summer Vacation
  - Book VI. Cambridge and the Alps

WILLIAM BLAKE
- The Golden Net
- The Mental Traveller
- Visions of the Daughters of Albion

T. S. ELIOT
- The Love Song of J. Alfred Prufrock
- Preludes
- The Waste Land

WALLACE STEVENS
- Thirteen Ways of Looking at a Blackbird
- Someone Puts a Pineapple Together
- So-and-so Reclining on Her Couch
- Not Ideas About the Thing . . .
- The Course of a Particular

STEPHEN TOULMIN
- The Construal of Reality

Appendix F

REPRESENTATION AND VALUE: LITERATURE, PHILOSOPHY, AND SCIENCE

A Symposium Jointly Sponsored by the Literature and Science Program,
Georgia Institute of Technology, and the National Endowment for the Humanities

Friday, February 21, 1986
Alumni/Faculty House, Georgia Institute of Technology

9-9:45 a.m.--Registration and Coffee

9:45-10 a.m.--Welcome: Paul B. Armstrong, Literature and Science, Georgia Tech
Dean Les A. Karlovitz, College of Science and Liberal Studies, Georgia Tech

10-11:45 a.m.--Barbara Herrnstein Smith, Professor of English and Communications, University of Pennsylvania: **"Value without Truth-Value"**

Respondents: Robert Detweiler, Graduate Institute of the Liberal Arts Emory University
Vincent Leitch, Department of English, Mercer University
Moderator: Robert Markley, Literature and Science, Georgia Tech

11:45 a.m.-1:15 p.m.--Lunch (Guthridge Lounge, Alumni/Faculty)

1:15-3 p.m.--Allen G. Debus, Morris Fishbein Professor of the History of Science, University of Chicago: **"Myth, Allegory, and Scientific Truth: An Alchemical Tradition in the Period of the Scientific Revolution"**

Respondents: David Finkelstein, School of Physics, Georgia Tech
William Sessions, Department of English, Georgia State University
Moderator: Kenneth J. Knoespel, Literature and Science, Georgia Tech

3:15-4:45 p.m.--Stephen E. Toulmin, Professor in the Committee on Social Thought, University of Chicago: **"Beyond Hermeneutics: From Critical Theory to Practical Interpretation"**

Respondents: Betty Jean Craige, Department of Comparative Literature, University of Georgia
Robert Segrest, College of Architecture, Georgia Tech
Moderator: Paul B. Armstrong, Literature and Science, Georgia Tech

4:45-6 p.m.--Reception, Lobby, Alumni/Faculty House

Registration Information

"Representation and Value" will take place at the Alumni/Faculty House, 224 North Avenue, N.W. (directly across from Grant Field). Parking is available behind the Student Center on the Tech campus. The Alumni/Faculty House is two blocks west of the North Avenue MARTA Station. For further information, call Dr. Jeffrey Plank, (404) 894-6816.

The Symposium registration fee is $10, which includes the reception. Lunch for an additional $7 is limited to the first 45 registrants. The deadline for registration is February 5, 1986. Make checks payable to Georgia Institute of Technology.

The Symposium

The purpose of the Symposium on "Representation and Value: Literature, Philosophy, and Science" is to inquire into the epistemological foundations of the so-called two cultures. Funding for the Symposium, as well as for curriculum development in the Literature and Science Program, has come from the National Endowment for the Humanities.

The Program

The Literature and Science Program is a new interdisciplinary curriculum in the Department of English at Georgia Tech. The program introduces undergraduates to different modes of thought and expression in order to challenge the opposition of the humanities and the natural sciences. By studying how different fields understand the world, students learn to explore the relation between their own area of expertise and different approaches to knowledge.

The Speakers

BARBARA HERRNSTEIN SMITH is the author of *Poetic Closure: A Study of How Poems End* (1968) and *On the Margins of Discourse: The Relation of Literature to Language* (1978). She is the recipient of the Christian Gauss award and the Explicator award as well as of fellowships from the Guggenheim and Rockefeller foundations, the National Endowment for the Humanities, and the Center for Advanced Studies in Behavioral Sciences. She is director of the Center for the Study of Art and Symbolic Behavior at the University of Pennsylvania, where she has taught since 1974.

ALLEN G. DEBUS is the author of *Man and Nature in the Renaissance* (1978), *The Chemical Philosophy: Paracelsian Science and Medicine in the Sixteenth and Seventeenth Centuries* (1977), and numerous other books and articles on the history of science and medicine. He has been a Fellow at the Institute for Advanced Study at Princeton, a member of the National Humanities Institute,and has held fellowships from the Guggenheim Foundation, the National Endowment for the Humanities, and the American Science Foundation. He has taught the history of science at the Universityity of Chicago since 1961 and was director of the Morris Fishbein Center for the History of Science and Medicine from 1971-77. Recently he was awarded an honorary Doctor of Science degree from the University of Louvain.

STEPHEN E. TOULMIN is the author of *The Return to Cosmology* (1982), *An Introduction to Reasoning* (1979), *Knowing and Acting* (1976), *Wittgenstein's Vienna* (1973), *Human Understanding* (1972), and many other books and articles on epistemology, the historical status of reason, and the philosophy of science. He taught at Oxford, Leeds, Brandeis, Michigan State, and Santa Cruz before joining the Committee on Social Thought at the University of Chicago, where he is also affiliated with the Department of Philosophy and the Divinity School.

Registration Form/"Representation and Value"

Please mail with your check to: Symposium Registration, Department of English, Georgia Tech, Atlanta, GA 30332.

( ) I want to register for the Symposium; enclosed is a check for $10.00.

( ) I want to register for the Symposium and for lunch; enclosed is a check for $17.00. (We will refund at the Symposium your payment for lunch if we cannot accomodate you).

Name _____

Address _____

Phone (office) _____ (home) _____

Academic Affiliation _____

Representation and Value: Literature, Philosophy, and Science

A Symposium Jointly Sponsored by
the Literature and Science Program
at the Georgia Institute of Technology
and the National Endowment for
the Humanities.

February 21, 1986
Alumni/Faculty House
Georgia Institute of Technology

Appendix G

Paul B. Armstrong
Department of English
Georgia Institute of Technology
Atlanta, Georgia 30332

Literature and Science Introductory Course
Instructor's Bibliography

The works on this list are background materials for teaching ENGL 2301--Introduction to Literature and Science. Items marked with an asterisk are essential reading.

I. Philosophy of Science and Related Readings

The items in this section provide philosophical background to the issues raised in the introductory course. The readings which are not strictly in the philosophy of science have to do with such related matters as the structure of perception, the process of representation, and the institutional history of knowledge.

A. The Structure of Knowledge

E. A. Burtt, The Philosophical Foundations of Modern Science
Criticism and the Growth of Knowledge, eds. Lakatos and Musgrave
Paul Feyerabend, Against Method
E. H. Gombrich, Art and Illusion
Nelson Goodman, Ways of Worldmaking
Gerald Holton, The Thematic Origins of Scientific Thought
The Scientific Imagination
Thomas S. Kuhn, The Essential Tension
The Structure of Scientific Revolutions
Imre Lakatos, The Methodology of Scientific Research Programmes
Larry Laudan, Progress and its Problems
Ernst Nagel, The Structure of Science
On Scientific Thinking, eds. Tweney, Doherty, and Mynatt
Michael Polanyi, Personal Knowledge
Karl Popper, Conjectures and Refutations
The Logic of Scientific Discovery
C. S. Peirce, "The Fixation of Belief"
"How to Make our Ideas Clear"
Paul Ricoeur, The Conflict of Interpretations
Richard Rorty, Philosophy and the Mirror of Nature
Frederick Suppe, The Structure of Scientific Theories
D. W. Theobald, "Some Considerations on the Philosophy of Chemistry"
Stephen Toulmin, Human Understanding

The Philosophy of Science
Walter B. Weimer, Notes on the Methodology of Scientific Discourse
A. N. Whitehead, Science and Philosophy

B. Language and Metaphor

Max Black, Models and Metaphors
Ernst Cassirer, Language and Myth
Howard E. Gruber, "Darwin's `Tree of Nature' and Other Images of Wide Scope"
Mary B. Hesse, Models and Analogies in Science
Paul Ricoeur, The Rule of Metaphor

C. History of Science and Knowledge

Michael Baxandall, Painting and Experience in Fifteenth-Century Italy
Herbert Butterfield, The Origins of Modern Science (revised edition)
Ernst Cassirer, The Individual and the Cosmos in Renaissance Philosophy
The Philosophy of the Enlightenment
A. C.Crombie, Augustine to Galileo, 2 vols.
Allen Debus, Man and Nature in the Renaissance
Benjamin Farrington,The Philosophy of Francis Bacon
Michel Foucault, The Archaeology of Knowledge
The Order of Things
Stephen Greenblatt, Renaissance Self-Fashioning
A. R. Hall, The Scientific Revolution 1500-1800: The Formation of the Modern Scientific Attitude (2nd ed.)
Martin Heidegger, "The Question Concerning Technology"
J. L. Heilbron, "Introductory Essay on John Dee's Mathematics and Physics"
Thomas S. Kuhn, The Copernican Revolution
John Mulder, The Temple of the Mind
Occult and Scientific Mentalities, ed. Brian Vickers
Walter J. Ong, Rhetoric, Romance, and Technology
Margery Purver, The Royal Society: Concept and Creation
Paolo Rossi, Francis Bacon: From Magic to Science
Jean Seznec, The Survival of the Pagan Gods
Wayne Shumaker, The Occult Sciences in the Renaissance
Charles Singer, A Short History of Scientific Ideas to 1900
F. Sherwood Taylor, A Short History of Science and Scientific Thought
The Twentieth-Century Sciences, ed. Gerald Holton
Barbara Von Eckardt, "The Scientific Status of Psychoanalysis"
James D. Watson, The Double Helix
Francis Yates, The Art of Memory

D. Literature and Science

Paul B. Armstrong, "Understanding and Truth in the Two Cultures"
E. Fred Carlisle, "Literature, Science, and Language"
Wilhelm Dilthey, Selected Writings
Hans Eichner, "The Rise of Modern Science and the Genesis of Romanticism"
Leonard B. Meyers, "Concerning the Sciences, the Arts--AND the Humanities"
On Aesthetics in Science, ed. Wechsler
Paul Ricoeur, Hermeneutics and the Human Sciences
Michel Serres, Hermes: Literature, Science, Philosophy
C. P. Snow, "The Two Cultures"
George Slusser and George Guffey, "Literature and Science"
Stephen Toulmin, "The Construal of Reality: Criticism in Modern and Postmodern Science"

II. Literary Theory

The entries listed below are not a comprehensive bibliography of the field. They are instead selections which have particular relevance to the relations between literature and science because of the issues of epistemology, metaphysics, and language they treat.

A. The Epistemology of Interpretation

Charles Altieri, "The Hermeneutics of Literary Indeterminacy"
Paul B. Armstrong, "The Conflict of Interpretations and the Limits of Pluralism"
Wayne Booth, Critical Understanding
R. G. Collingwood, An Autobiography
Walter Davis, The Act of Interpretation
John M. Ellis, The Theory of Literary Criticism
Stanley Fish, Is There a Text in this Class?
Martin Heidegger, "Understanding and Interpretation"
E. D. Hirsch, Jr., Validity in Interpretation
Norman Holland, "Unity Identity Text Self"
Wolfgang Iser, The Act of Reading
Jean-Paul Sartre, What is Literature?
Evan Watkins, The Critical Act
Rene Wellek and Austin Warren, Theory of Literature
P. M. Wetherrill, The Literary Text

B. Language and Metaphor

Roland Barthes, Critical Essays
Elements of Semiology
Kenneth Burke, Language as Symbolic Action
A Grammar of Motives
The Philosophy of Literary Form
Jonathan Culler, Structuralist Poetics

Paul De Man, "The Epistemology of Metaphor"
Jacques Derrida, "Differance"
"Structure, Sign, and Play in the Discourse of the Human Sciences"
Umberto Eco, A Theory of Semiotics
Claude Levi-Strauss, The Savage Mind
"The Structural Study of Myth"
I. A. Richards, The Principles of Literary Criticism
Edward W. Said, Beginnings
Ferdinand de Saussure, Course in General Linguistics
Barbara Herrnstein Smith, On the Margins of Discourse
Hayden White, Tropics of Discourse

C. History of Criticism and Literature

M. H. Abrams, The Mirror and the Lamp
Hans-Georg Gadamer, Truth and Method
Juergen Habermas, Knowledge and Human Interests
Hans Robert Jauss, "Literary History as a Challenge to Literary Theory"
Edward W. Said, The World, the Text, the Critic
Leo Spitzer, Linguistics and Literary History

III. Literary and Intellectual History

The listings in this section include works taught in the junior- and senior-level courses which follow the introductory course.

A. Writers in the Age of Galileo

Francis Bacon, New Atlantis
Cervantes, Selections from Don Quixote
John Dee, Preface to Euclid's Elements
Descartes, Selected Meditations
John Donne, Selected Sonnets
Galileo, Letters on Sunspots
The Starry Messenger
Gabriel Harvey, The Circulation of the Blood
Ben Jonson, The Alchemist
Christopher Marlowe, Doctor Faustus
Andrew Marvell, Selected Poems
Michel de Montaigne, Selected Essays
John Milton, Paradise Lost
Pico della Mirandola, The Dignity of Man
Philip Sidney, The Art of Poetry
Theatrum Chemicum Britannicum (selections
William Shakespeare, The Tempest

B. Writers in the Age of Newton

William Blake, Albion
The Marriage of Heaven and Hell
Songs of Innocence and Songs of Experience

George Cheyne, An Essay of Health and Long Life
William Collins, Selected Poems
Daniel Defoe, Robinson Crusoe
Diderot, Jacques le Fataliste
Franklin, Autobiography
J. W. Goethe, Faust, Part I
Oliver Goldsmith, Selected Poems
Thomas Gray, Selected Poems
Johann Herder, Origins of Language
Samuel Johnson, The Rambler
The Life of Gray
Leibniz, Selected Writings
John Locke, Essay Concerning Human Understanding
Newton's Philosophy of Nature, trans. Standish Thayer
Alexander Pope, Selected Poems
Philosophical Transactions of the Royal Society (selections)
Jean-Jacques Rousseau, Discourse on the Sciences and the Arts
Les Reveries du promeneur solitarie
Jonathan Swift, Gulliver's Travels
James Thomson, The Seasons (Spring)

C. Writers in the Age of Darwin

Matthew Arnold, Culture and Anarchy
"The Function of Criticism at the Present Time"
"Literature and Science"
Selected Poems
Coleridge, Biographia Literaria
Charles Darwin, The Origin of Species
The Descent of Man
Charles Dickens, Hard Times
Dostoevsky, Crime and Punishment
Notes from Underground
Flaubert, Madame Bovary
Karl Marx, excerpts from Capital
The Communist Manifesto
The German Ideology
John Stuart Mill, Autobiography
Nietzsche, The Genealogy of Morals
Tolstoy, "The Death of Ivan Ilyich"
Wordsworth, Selected Poems

D. Writers in the Age of Einstein and Freud

Samuel Beckett, Waiting for Godot
Joseph Conrad, Heart of Darkness
Lord Jim
Albert Einstein, The Meaning of Relativity
T. S. Eliot, Selected Poems
Ford Madox Ford, The Good Soldier
Sigmund Freud, Civilization and its Discontents

Dora
Introductory Lectures on Psychoanalysis
Andre Gide, The Immoralist
Henry James, The Turn of the Screw
William James, Pragmatism
James Joyce, Portrait of the Artist as a Young Man
Franz Kafka, Penal Colony
Kierkegaard, Fear and Trembling
D. H. Lawrence, Selected Stories
Thomas Mann, "Death in Venice"
Ezra Pound, Selected Poems
Jean-Paul Sartre, "Existentialism is a Humanism"
Nausea
Virginia Woolf, Mrs. Dalloway

Additions:

Evelyn Fox Keller, A Feel for the Organism
Gender and Science
Barry Barnes, About Science
Michael Mulcahey, Science and the Sociology of Knowledge
Christopher Hill, The World Turned Upside Down
Wendy Steiner, The Colors of Rhetoric
Lakoff and Johnson, Metaphors We Live By
P. D. Medawar, "Is the Scientific Paper a Fraud?"
Betty Jo Dobbs, Hunting the Green Lion

Appendix H

Georgia Institute of Technology
Atlanta, Georgia 30332

College of Sciences and Liberal Studies
Department of English
(404) 894-2730

October 22, 1984

TO: Deans, Directors, Department Heads, and Undergraduate Advisors

FROM: Paul Armstrong, Chair, Literature and Science Program,
Department of English

SUBJECT: Humanities Credit Courses in Literature and Science

In recognition of the special interests and capabilities of Georgia Tech students, the Department of English now offers a series of humanities credit courses on the relations between literature and science. I am writing to encourage you to tell your majors about this program and to invite your suggestions about how it may be further developed to meet the needs of your students.

The courses in the series have the following goals:

--to challenge the conventional opposition of the so-called "two cultures";

--to analyze and compare the structure of understanding in literary and scientific inquiry;

--to explore the historical relations between some of the major scientific theories, literary forms, and intellectual perspectives in the development of western culture.

The program hopes to help students achieve a better understanding and appreciation of the humanities by challenging their misconceptions about literary study. The courses show that scientists and literary critics employ many similar procedures even though they try to solve different problems and have different professional affiliations.

The program consists of one new course and four familiar courses which have been completely revised:

ENGL 2301--Introduction to Literature and Science
ENGL 3041--Writers in the Age of Galileo
ENGL 3042--Writers in the Age of Newton
ENGL 3043--Writers in the Age of Darwin
ENGL 3044--Writers in the Age of Einstein and Freud

These courses may be taken separately and in any order. ENGL 1001-1002 is the only prerequisite. ENGL 2301 is taught every quarter; the others, at least twice a year. Brief course descriptions are attached.

For many years engineering as well as humanities educators have been concerned about the gap between professional training and humanities education at technical institutions. Our program seeks to bridge that gap at Georgia Tech by bringing to our students courses in the important new academic field of literature and science.

DEPARTMENT OF ENGLISH
LITERATURE AND SCIENCE PROGRAM
LIST OF COURSES

These courses may be taken separately and in any order. The only prerequisites are ENGL 1001-1002. All carry humanities credit. Questions may be directed to Dr. Paul Armstrong (Skiles 321; 894-2737).

ENGL 2301--Literature and Science

Do the humanities and the natural sciences employ different structures and procedures of understanding, or do they use similar methods to solve different problems? The course answers this question by comparing and contrasting various aspects of the process of understanding in many different fields: poetry, painting, science, prose fiction, and literary criticism. Readings include James Joyce's Portrait of the Artist as a Young Man, James Watson's Double Helix, Thomas Kuhn's Structure of Scientific Revolutions, and E. H. Gombrich's Art and Illusion.

ENGL 3041--Writers in the Age of Galileo

Through a study of the forms and methods underlying literary and scientific texts, the course analyzes the changing views of nature in the sixteenth and seventeenth centuries. Special attention is paid to the ways in which the literature of the period is part of an evolving scientific methodology. Texts include works by Francis Bacon and Galileo; Christopher Marlowe, Dr. Faustus; Ben Jonson, The Alchemist, and John Donne's sonnets.

ENGL 3042--Writers in the Age of Newton

This course explores a range of eighteenth-century English literature and its philosophical foundations. Examining the reasons for Newton's enormous influence on the century, the course analyzes the way in which Newtonian philosophy leads poets to reassess language and its relation to reality. Authors studied include Defoe, Swift, Pope, Samuel Johnson, and William Blake.

ENGL 3043--Writers in the Age of Darwin

An interdisciplinary comparison of the thought and literature of the nineteenth century. The central theme of the course is the dilemma of reconciling a belief in spiritual values with skepticism about the limitations of the material world. Readings include excerpts from works by Darwin, Marx, and Nietzsche as well as fiction by Tolstoy, Flaubert, Dickens, and Dostoevsky.

ENGL 3044--Writers in the Age of Einstein and Freud

The main theme of this course is the modern period's discovery of the challenges and dilemmas of pluralism. The course asks how various important modern thinkers and writers respond to the question: What can we know and how should we act in a world where many different perspectives compete for our allegiance? Texts include a case history by Freud, excerpts from William James's Pragmatism and Kierkegaard's Fear and Trembling, as well as fiction by D. H. Lawrence, Joseph Conrad, Henry James, and Jean-Paul Sartre.

THE CENTENNIAL SHOW

1 This brief presentation will acquaint you with the new, exciting program in "Literature and Science" 2 now offered by the Georgia Tech Department of English.

I'm Professor Jim Young
and I'm Professor Ken Knoespel.

3 The program asks in a number of ways how we know, understand, and interpret the world we are a part of. Rather than depend on any view of "two cultures," the courses in the program try to ask questions about the similarity of these intellectual disciplines:

4 how do we use languages, codes, and models
5 how have these representations changed over time
6 how do we interpret these various representations

7 This is an approach to the world we know-- 8 and live in and think about. 9 What we know about the world depends on where we are and what we see— 10 but also on what we think we see. 11 Each of these views is ten times closer than the previous one, 12 defined in each picture by the blue square. 13 Notice how quickly the blue square itself becomes a factor in what we know. 14 15 16 17 18 Only for a short time does the world we see here seem familiar-- 19 one that we have known by direct perception. 20 21 But what we know about the world 22 is not just dependent on perception 23 but on our ideas-- 24 our thought-- 25 about the world and our experience of it.

Codes and Change

26 We have developed several kinds of languages--or systems of codes--to allow us to think about the world, 27 languages that strangely become the world or at least become a position 28 from which we view the world, 29 just as our earlier blue squares defined where we were and what we saw. 30 Some systems of codes are linguistic; others are mathematical, 31 32 or chemical, 33 34 or based on color, 35 36 or musical. 37 38All have changed over time-- 39 40 41 all trying to describe and help us think about a particular "blue square."

42 When we use these various languages to think about the world, we discover that much of "what we see" is the consequence of the languages we use— 43 that what we know of the world is the result of how we think--of how we use the languages we invent.

44 So the shape of the world is the shape we give it. One periodical table of elements is not 45 just like another. 46 One diagram of the heavens is not 47 just like another--certainly not when we place different things in the center of the picture-- 48 first our earth and then our sun.

49 Galileo's sketches of the craters on the moon 50 caused him to wonder how a sunrise would appear there. 51 This is a sunrise--on Mars— 52 and this is a sunset there. 53 And this is now we know. 54 These are views of Jupiter's moons and atmosphere. But what are we to think of them? 55 How are these pictures to be understood? How are they to be "interpreted"?

Interpretation

56 Pictures are already interpretive acts whether they are TV images **57** or paintings. **58** Each invite further analysis which can involve a variety of other codes. **59** Pictures give orientation because they formulate relations and narratives that may have special significance within other codes. **60** Physical laws are also represented by images of canons, **61** skaters, **62** and boats.

63 Many of the pictures we use are maps-- **64** shaping the world in ways that we understand, **65** so that we can understand it. **66** This is a map of the Marshall Islands, an archipelago in the central Pacific. The map shows ocean currents and winds by length and thickness of the palm strips. **67** Other maps demonstrate the political supremacy of Germany and later **68** the authority of a U. N. trusteeship.

69 Novels, short stories, poems are important ways of mapping or interpreting the world. They too change over time. We cannot read Robinson Crusoe today as it was read in 1719 because the codes we use to understand it have changed.

Finally, literature and science alike remind us that the world and our experience of it are things we continually interpret. Really, interpretation is a function of how we want to see something--whether it is **70** a woman, **71** a poem, **72** or a mysterious scene. **73**

Let's pause for a moment and describe or interpret this scene. As our eyes range over the painting we create hypothetical narratives that might explain what we see. Eventually we may choose one over another for reasons which depend on our own experience:

"The moon is out and full. The sky is that near blue of bright clear nights, so bright that one can see only a few of the brightest stars. On the horizon the sharp, barren mountains, then the desert, like a sea. Here the barren ground, the vulnerable figure protected by its sleep, and that peculiarly self-contained lion. One assumes he--or is it she--is asleep, though from the look of the face he might be dead, the skin blackened by the desert sun. This perhaps would explain the quiescence of the lion. Natural repugnance for dead meat strike carrion. Leather bones rotten meat. Dead one would say, from the odd angle of the feet protruding from the robe strike striped robe that could be by Noland or Morris Louis, from the exposed teeth, the eyes open perhaps very slightly. Or is he about to awake, the eyes opening strike the eyes on the point of opening, to confront the lion with his stick and his mandolin, or is it lute, by his side. Next to the lute, we'll call it a lute, a brown jug, of water let's hope. . . ."

Like our interpretation of physical phenomena in the sciences, here too we formulate and test hypotheses on the basis of our experience. **74** The phenomena we respond to everyday **75** involve a variety of symbolic codes. **76** Whether we approach our experience through the disciplines of science **77** or literature, we are exploring what we share. **78**

79 Finally **80** we have only our world again.

Appendix J

Paul B. Armstrong

Faculty Development Quarter
Fall 1984

A large proportion of my quarter was spent setting up the grant. There were many administrative matters to attend to, and important early measures had to be taken so that the grant would be used successfully. The most important of these was securing the services of appropriate, distinguished consultants. In the research I did before sending out invitations, I tried to find out not only what possible candidates had done in the past but also what they were currently working on. I also mapped out and initiated a publicity campaign to let Georgia Tech's faculty and students know about the program.

My research and reading were directed toward three primary areas. My areas of expertise in literature and science are literary theory and the philosophy of science. I read further in these fields as I prepared the bibliography for instructors of ENGL 2301 (see Appendix G). My knowledge of the history of science was deficient, especially the earlier periods, and I used the bibliography as I was preparing it in order to begin to remedy this.

The concrete results of the quarter's work were a special session which I chaired at the 1984 MLA Convention on "The Epistemology of Metaphor and Narrative," and a special issue of Hartford Studies in Literature, 17, no. 2 (1985), of which I was guest editor in which the papers delivered in the session appeared. I also contributed an essay entitled "Reading Figures: The Cognitive Powers of Metaphor." Although this essay was written in the Summer of 1985, after my leave, it was based in part on reading I did during my faculty development quarter.

APPENDIX K

Faculty Development Quarter
Winter 1985
Kenneth J. Knoespel

Curriculum development, administration, and research and writing occupied my quarter leave (Winter 1985). Since I was to teach a new course, "Metaphor and Narrative," on a trial basis during the coming spring quarter, I used part of my time for course preparation. My work involved an ongoing survey of volumes from the Transactions of the Royal Society and study of theoretical discussions on metaphor and thought experiments.

During the quarter I also helped to administer and represent the program. To explain our courses to prospective students, I gave two lectures to approximately four-hundred freshmen on the changing representation of cosmology in literature and science. Using slides and examples from ancient and modern literature, I showed how cosmologies can define the way a society sees itself and how they contribute to the way a culture seeks to acquire knowledge. I also assisted Paul Armstrong in preparing the "Bibliography for Instructors of 2301" and in making arrangements for our consultants first campus visit. In particular I arranged for Allen G. Debus to participate in a discussion about alchemy in my course on Galileo.

Having previously discovered an unused collection of rare books in the history of science and technology in the Price Gilbert Memorial Library, I began to prepare for an exhibition of the books with my library colleague, Crit Stuart. Initial work--which occupied one day a week during the quarter--included a biblio-

graphic search of books in the collection, the preparation of slides showing books that might be exhibited, and negotiation with the library for remodeling of the exhibition space. The exhibition, which evolved from the use of the rare books in our courses on Galileo and Newton, attracted hundreds of visitors to campus after it opened in the fall of 1985.

My research and writing received the major benefit from the quarter off. With the time given me, I completed my monograph Narcissus and the Invention of Personal History and delivered it to my publisher by the end of the quarter. The book, which deals with the psychological significance of the Narcissus story before Freud, was published by Garland Press in the fall of 1985. Toward the end of the quarter I also returned to a project on fabulae in the Middle Ages. My research on fable and narrative, substantially completed during the quarter off, appeared as an article, "The Epistemology of Expanding Narrative," in Hartford Studies in Literature, 17:2 (1985).

Appendix L

Robert Markley
Description of Faculty Development Leave
Winter 1986

The bulk of my time during my faculty development leave has been devoted to revising a book manuscript on language theory and seventeenth-century drama, Two Edg'd Weapons: Language and Ideology in the Comedies of Etherege, Wycherley, and Congreve. A version of this manuscript was originally submitted to Oxford University Press in the Spring of 1985. In November 1985 I received two readers' reports and a letter from the English Literature Editor encouraging me to revise the opening chapters and re-submit the manuscript. These chapters deal specifically with the problems of language theory and stylistic practice in the late seventeenth century and with current attempts to describe "style" theoretically and prescribe a method for its analysis. The revised manuscript will be resubmitted to Oxford by the end of Spring Quarter, June 1986.

My work on this manuscript is relevant to the Literature and Science Program at Georgia Tech in two ways: my research on the problems of language and representation in the 1600s has led me to broaden my ongoing studies of the relationships among different literary and non-literary genres during the period and, secondly, it has suggested a number of possibilities for structuring my syllabus for English 3042, Literature in the Age of Newton (which I will teach for the first time in the Spring of 1986). During my leave, I have done a good deal of reading for, and outlined, an article which investigates the problem of representation in the works of the Russian theorist Mikhail Bakhtin. Bakhtin, I believe, develops a theory of language which can account for epistemological similarities between literary and scientific discourses. The application of his "anti-linguistics" therefore has important pedagogical implications for interdisciplinary studies.

In my courses in Literature and Science in the Spring (2301 and 3042) I intend to introduce some of Bakhtin's key theoretical notions to focus class discussions on the ways in which both literary and scientific discourses are implicated in their historical and cultural contexts.

Appendix M

SUMMARY OF FACULTY DEVELOPMENT QUARTER
James D. Young (Spring 1985)

Most of the quarter for faculty development was planned to prepare me to teach a new course, English 2301, "Introduction to Literature and Science" in Fall of 1985. That preparation was focused in four areas--and actually took most of the following Summer Quarter to accomplish: a reading of relevant background works, the planning of the course syllabus, the reading of the selected course texts, and the drafting of writing topics.

Recognizing that the "Instructor's Bibliography" for the introductory course in Literature and Science was essentially a reference work--not a reading list, I asked both Barbara Smith and Allen Debus for comments on the list and for suggested additions. Both responded positively, giving a critique of the list as they saw it, suggesting additions, and marking certain works as important and essential reading for any instructor in the program. I spent some time reading books that I thought I should know: Barry Barnes, T. S. Kuhn and the Social Sciences, and Paul Feyerabend, Science in a Free Society, to give two examples.

The planning of the course syllabus was assisted by having model syllabi from others who had taught sections of the course. A study of what others had done and decisions about what I thought I wanted to do merely strengthened the three-part division of the course: problems of assumptions, representation, and interpretation.

Because our Bookstore needed text-lists much before I thought it would, I spent time reading texts that I had selected for the

course (but had not read in some time): Kuhn's The Structure of Scientific Revolutions and Cary's The Horse's Mouth. I also spent time reading and selecting poetry for the second section of the course.

The final part of the development was extended not only into the Summer Quarter but also into the Fall Quarter (when I taught the course). Deciding on topics and problems for student writing needed to be informed by the abilities of the class--so that many possibilities were formulated and revised.

My intention is to teach this course a second time (Spring 1986) in essentially the same form. After a second experience, I may know more precisely what the course's successes are.

30 March 1986